

ORIGINAL



SDMS DocID 2185525



Dawn Ioven/R3/USEPA/US

04/06/2005 03:32 PM

To: Linda Dietz/R3/USEPA/US@EPA

cc

bcc

Subject: Re: Fw: R32094 - Safety Light Corp. 

Hi, Linda. I reviewed the attached rad results for gw samples collected from the Safety Light site. Several wells contained noteworthy levels of thorium-230 (up to 43.5 pCi/L) and, to a lesser extent, tritium (up to 1340 pCi/L). According to U.S. EPA's website for calculating Preliminary Remediation Goals (PRGs) for radionuclides, generic PRGs for these isotopes in drinking water are 0.523 pCi/L and 144 pCi/L, respectively. (These PRGs are similar to RBCs, incorporating default exposure parameters to estimate concentrations equivalent to an excess cancer risk of $1E-06$.) Considering this and assuming that the reported results are accurate, the residential risk associated with the maximum detected level of thorium-230 is approximately $8.3E-05$; for tritium, the risk is $9.3E-06$. The cumulative cancer risk from exposure to these radionuclides ($9.2E-05$) is very close to the upper end of U.S. EPA's acceptable risk range ($1E-04$).

By the way, I noticed that the duplicate field blank had hits of both thorium-230 (43.3 pCi/L) and tritium (1020 pCi/L). I'm surprised that results from some (or all) of the other samples weren't flagged with a B qualifier, indicating blank contamination. We should check with the lab about this, as this could impact our conclusions regarding potential risk.

Any questions, please let me know. Thanks for your patience.

Dawn

Linda Dietz



Linda Dietz

03/24/2005 04:12 PM

To: Dawn Ioven/R3/USEPA/US@EPA

cc:

Subject: Fw: R32094 - Safety Light Corp.

Attached are the rad results. Please let me know what you think.

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

— Forwarded by Linda Dietz/R3/USEPA/US on 03/24/2005 04:11 PM —



(b) (4)

03/24/2005 09:36 AM

To: Linda Dietz/R3/USEPA/US@EPA

cc: Khin-Cho Thaung/ESC/R3/USEPA/US@EPA, (b) (4) @ttnus.com
Subject: R32094 - Safety Light Corp.



Linda Dietz 3HS21
US EPA Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

March 24, 2005



(b) (4)
(b) (4) [redacted]@ttmus.com>
04/07/2005 09:44 AM

To: Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject: RE: R32094 - Safety Light Corp.

Linda- the duplicate field blank Dawn refers to is acutally the duplicate (from Murphy well). The correlation is very good between these samples and the field blank was non-detect, so there is no problem with the qualifiers.

-----Original Message-----

From: Dietz.Linda@epamail.epa.gov [mailto:Dietz.Linda@epamail.epa.gov]
Sent: Thursday, April 07, 2005 8:34 AM
To: (b) (4)
Cc: Rudolph.Ashlee@epamail.epa.gov
Subject: Fw: R32094 - Safety Light Corp.

Andy,

Here is Dawn Ioven's review of the rad data. Do you have any feedback from your tox on this ? Also, Dawn raises a issue with respect to the field blank contamination. Can you check this out also ? Thanks

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

----- Forwarded by Linda Dietz/R3/USEPA/US on 04/07/2005 09:31 AM -----

Dawn Ioven

Dietz/R3/USEPA/US@EPA	To: Linda
04/06/2005 03:32	cc:
PM	Subject: Re: Fw: R32094 -
Safety Light Corp. (Document link:	Linda Dietz)

Hi, Linda. I reviewed the attached rad results for gw samples collected from the Safety Light site. Several wells contained noteworthy levels of thorium-230 (up to 43.5 pCi/L) and, to a lesser extent, tritium (up to 1340 pCi/L). According to U.S. EPA's website for calculating Preliminary Remediation Goals (PRGs) for radionuclides, generic PRGs for these isotopes in drinking water are 0.523 pCi/L and 144 pCi/L, respectively. (These PRGs are similar to RBCs, incorporating default exposure parameters to estimate concentrations equivalent to an excess cancer risk of 1E-06.) Considering this and assuming that the reported results are accurate, the residential risk associated with the maximum detected level of thorium-230 is approximately 8.3E-05; for tritium, the risk is 9.3E-06. The cumulative cancer risk from exposure to these radionuclides (9.2E-05) is very close to



(b) (4)
[REDACTED]@epa.gov
04/08/2005 08:52 AM

To: Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject: RE: R32094 - Safety Light Corp.

Linda- Dawn's calculations match ours- the total cumulative cancer risk is at the high end of the acceptable range - primarily due to Th-230. I'm trying to hunt down Phil or Lawson to see if they can shed some light on this- why we would expect to find it based on site history- and will let you know their thoughts.

-----Original Message-----

From: Dietz.Linda@epamail.epa.gov [mailto:Dietz.Linda@epamail.epa.gov]
Sent: Thursday, April 07, 2005 8:34 AM
To: (b) (4)
Cc: Rudolph.Ashlee@epamail.epa.gov
Subject: Fw: R32094 - Safety Light Corp.

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Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

----- Forwarded by Linda Dietz/R3/USEPA/US on 04/07/2005 09:31 AM -----

Dawn Ioven

Dietz/R3/USEPA/US@EPA

04/06/2005 03:32

PM

Safety Light Corp. (Document link:

To: Linda

cc:

Subject: Re: Fw: R32094 -

Linda Dietz)

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(b) (4)
(b) (4) @ttnus.com>
04/08/2005 01:06 PM

To: Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject: RE: R32094 - Safety Light Corp.

Not that I know of. There were no children when I did the well survey. I'll check with Chuck when he gets back in from the field.

-----Original Message-----

From: Dietz.Linda@epamail.epa.gov [mailto:Dietz.Linda@epamail.epa.gov]
Sent: Friday, April 08, 2005 11:02 AM
To: (b) (4)
Subject: RE: R32094 - Safety Light Corp.

Do you know if there are any children living in the house ?

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

(b) (4)
Dietz/R3/USEPA/US@EPA
(b) (4) ttnus
.com>
To: Linda
cc:
Subject: RE: R32094 - Safety
Light Corp.

04/08/2005 08:52

AM

Linda- Dawn's calculations match ours- the total cumulative cancer risk is at the high end of the acceptable range - primarily due to Th-230. I'm trying to hunt down Phil or Lawson to see if they can shed some light on this- why we would expect to find it based on site history- and will let you know their thoughts.

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Sent: Thursday, April 07, 2005 8:34 AM
To: (b) (4)
Cc: Rudolph.Ashlee@epamail.epa.gov



(b) (4)
[redacted]@ttnus.com>
04/11/2005 09:44 AM

To: Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject: RE: R32094 - Safety Light Corp.

Linda- got hold of Phil and he checked the records - there is no record of SLC using thorium. One question came up as we were discussing the data- Th-230 is an alpha emitter; therefore, we should see detections in the gross alpha analyses (which we do not even at a reporting limit lower than the Thorium analysis). That would lead to either the Th or alpha results being suspect. There's nothing in the data validation package that indicates any problem with either analysis. If you'd like, we can see if we can get Ft. Meade to send us all the raw data to see if there's something there that could indicate a problem with either analysis.

Andy

-----Original Message-----

From: Dietz.Linda@epamail.epa.gov [mailto:Dietz.Linda@epamail.epa.gov]
Sent: Friday, April 08, 2005 11:02 AM
To: (b) (4)
Subject: RE: R32094 - Safety Light Corp.

Do you know if there are any children living in the house ?

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

(b) (4)
[redacted]
Dietz/R3/USEPA/US@EPA
(b) (4)@ttnus
[redacted].com>

To: Linda
cc:
Subject: RE: R32094 - Safety

Light Corp.

04/08/2005 08:52
AM

Linda- Dawn's calculations match ours- the total cumulative cancer risk is at the high end of the acceptable range - primarily due to Th-230. I'm



(b) (4)
[redacted]@ttnus.com>
04/11/2005 09:58 AM

To: Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject: RE: R32094 - Safety Light Corp.

We'll contact Ft. Meade and let you know what they say.

-----Original Message-----

From: Dietz.Linda@epamail.epa.gov [mailto:Dietz.Linda@epamail.epa.gov]
Sent: Monday, April 11, 2005 8:55 AM
To: (b) (4)
Cc: Ioven.Dawn@epamail.epa.gov; Rudolph.Ashlee@epamail.epa.gov
Subject: RE: R32094 - Safety Light Corp.

Yes, I would like to do that. I need to send out the results and I would like to have a clear answer for the residents. Can you send the request to Fort Meade for me? I can send the results to Las Vegas and have them look at it but I know the national radiation meeting is this week so not much will get accomplished until next week. Talk to Fort Meade and let me know how fast they can get the data to you. Also, I'll check with Jeff Whitehead and Marie Miller to make sure we haven't missed any historical issues.

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

(b) (4)
[redacted]
Dietz/R3/USEPA/US@EPA [redacted]
[redacted]@ttnus
[redacted].com>
Light Corp.

To: Linda
cc:
Subject: RE: R32094 - Safety

04/11/2005 09:44
AM

Linda- got hold of Phil and he checked the records - there is no record of SLC using thorium. One question came up as we were discussing the data- Th-230 is an alpha emitter; therefore, we should see detections in the gross alpha analyses (which we do not even at a reporting limit lower than the Thorium analysis). That would lead to either the Th or alpha results being suspect. There's nothing in the data validation package that indicates any



(b) (4)
[redacted]@ttnus.com>
04/11/2005 11:22 AM

To Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject RE: R32094 - Safety Light Corp.

Linda- Ft. Meade said they will pull the data and look at it again; however, you need to authorize it. Contact Kin-Cho Thaung 410-305-2743. Case #R32094, SDG #131077. Have them check results for Th-230 performed under Method 901.1 and Gross alpha performed under Method 900.0. You can let them know that we have positive results for Th-230 which is an alpha emitter but Non-detect for gross alpha.

Andy

-----Original Message-----

From: Dietz.Linda@epamail.epa.gov [mailto:Dietz.Linda@epamail.epa.gov]
Sent: Monday, April 11, 2005 8:55 AM
To: (b) (4)
Cc: Ioven.Dawn@epamail.epa.gov; Rudolph.Ashlee@epamail.epa.gov
Subject: RE: R32094 - Safety Light Corp.

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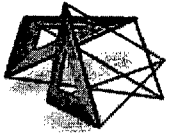
Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

(b) (4)
[redacted]
Dietz/R3/USEPA/US@EPA (b) (4)@ttnus
[redacted].com>
Light Corp.

To: Linda
cc:
Subject: RE: R32094 - Safety

04/11/2005 09:44

AM



Khin-Cho
Thaung/ESC/R3/USEPA/US
04/20/2005 10:42 AM

To Linda Dietz/R3/USEPA/US@EPA
cc
bcc
Subject Re: Safety Light Corporation 

Linda,

I requested my ESAT contractor to check the validation again as per your request. I had to send a request to the record manager to locate the data package from the archive.

ESAT will let me know as soon as they finish checking it again.

ESAT told me that they had already done the checking before and based on the calculation formula used by the lab it was indeed positive for Th-230 and not sure why it did not show up in gross alpha.

Khin

Linda Dietz



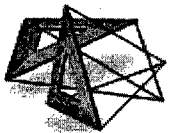
Linda Dietz
04/20/2005 10:15 AM

To: Khin-Cho Thaung/ESC/R3/USEPA/US@EPA
cc:
Subject: Safety Light Corporation

Khin,

Was wondering if you received my e-mail yesterday and what the plan of action is .

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195



Khin-Cho
Thaung/ESC/R3/USEPA/US
04/25/2005 09:19 AM

To Linda Dietz/R3/USEPA/US@EPA
cc
bcc

Subject Fw: Thorium-230 results, Safety Light Corporation

History

This message has been forwarded.

Linda,

Below is the explanation received from the lab that did the analysis for this site. Let me know if this is acceptable.

Khin

In response to the e-mail dated April 19th:

The Gross Alpha batch was reviewed by the Group Leader and the Data Validator. There were not any errors discovered.

Th-230 by gamma spec is actually quantified off the Bi-214 daughter, assuming secular equilibrium. As the water sits in the well natural radiation from the sediment or rock in the bottom of the well decay. Th-230 alpha decays to Ra-226 which alpha decays to Rn-222 and so on through stable Pb. Since Rn-222 is a gas, it diffuses into the water in the well. It appears the sample was separated from the Th-230 and Ra-226 source at the time of sampling. Since the water was in secular equilibrium at the time of sampling Bi-214 would still remain in the gamma sample at the time of counting, and therefore Th-230 would be quantified by the instrumentation. Since the Th-230 and Ra-226 were left behind during sampling, and Rn-222 and Po-218 would volatilize during the Gross Alpha procedure, there would not be a gross alpha detection.

We can qualify or reject the results based off of this theory.

Please respond directly to me if you have any questions.
I have copied the original request below.

Thanks,

(b) (4)

In response to the following:

Samples listed below reported positive results for Thorium-230. Gross alpha data for these samples were non-detects. Since Thorium is an alpha emitter, gross alpha is expected to be positive for these samples. Please request the laboratory to double check calculations and raw data for both thorium and gross alpha.

EPA Sample Number	Lab Sample Number
DUP-01	131077002
RW1-021605	131077001
RW2-021605	131077005
RW4-021605	131077006
RW5-021605	131077007
RW6-021605	131077008

--
(b) (4)

General Engineering Laboratories, LLC

2040 Savage Road

Charleston, SC (USA) 29407

Phone: 843.769.7386

Fax: 843.766.1178

(b) (4)

Web: www.gel.com



(b) (4)
@ttnus.com>
04/25/2005 03:51 PM

To: Linda Dietz/R3/USEPA/US@EPA
cc
bcc

Subject: FW: Thorium-230 results, Safety Light Corporation

History: This message has been forwarded.

Linda- See Phil's explanation below (he consulted with a radiochemist in his office as well). The Th-230 is not really in the tap water. Phil suggested we get the Bi-214 result; however, Bi-214 is not reported in the data set. Before we even want to make that an issue, I tried to look up the EPA PRG calculator to see if there is even a benchmark for Bi-214, but cannot get into the website. The 1/2 life of Bi-214 is very short (unlike Th-230), so there may not be much risk associated with Bi-214. Maybe Dawn has access to the PRG calculator and can look up Bi-214. I'll try later as well. At this time; however, we can conclude that Th-230 is not being consumed.

Andy

-----Original Message-----

From: Young, Philip
Sent: Monday, April 25, 2005 2:05 PM
To: (b) (4)
Subject: RE: Thorium-230 results, Safety Light Corporation

Andy,

As we discussed on the phone, the lab's explanation below is a valid description of the situation. The Th-230 and Ra-226 are in equilibrium with their daughter products (Rn-222, Bi-214, etc.), in the groundwater. However, as the water is being withdrawn from the ground, these parent radionuclides are being separated from their daughters, as seen by the non-detects for gross alpha.

Therefore, it is not appropriate to use the Bi-214 result to quantify the Th-230 concentration in the tap water. I would recommend that the Bi-214 concentration be reported and compared to its risk level.

Call me if you have any questions.

Phil

-----Original Message-----

From: (b) (4)
Sent: Monday, April 25, 2005 9:52 AM
To: Young, Philip
Subject: FW: Thorium-230 results, Safety Light Corporation

Phil- below is explanation from lab regarding why we saw Th-230 but no gross alpha detects. Can you provide some input on how we should handle the results- we need to report results to the homeowners and we have Th-230 up to 43.5 pCi/l which presents a calculated risk near the high end of EPA's acceptable range (8.30E-05). Should results be qualified or rejected?
Thanks

Andy



Dawn Ioven/R3/USEPA/US

04/27/2005 10:31 AM

To Linda Dietz/R3/USEPA/US@EPA

cc (b) (4) <FrebowitzA@ttnus.com>

bcc

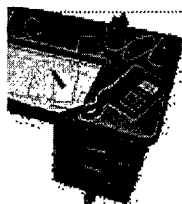
Subject Re: Fw: Thorium-230 results, Safety Light Corporation

Hi, Linda. Sorry for not responding sooner, but I was out of the office yesterday. I had to read through these messages a few times before I had a handle on this issue. The thorium-230 findings reported in the Safety Light gw data set are apparently not real; rather, they are an artifact of the analytical method for detecting thorium-230. These data points (for thorium-230) should have been rejected (or flagged, at least) by the lab during validation. We could look for the daughter product (Bi-214) from which the thorium-230 activity was erroneously reported. However, as Andy mentions in his message, the half-life of Bi-214 is very short. Because of this, Bi-214 is not likely to exist in the environment for very long. Further, according to EPA's PRG calculator, the PRG for Bi-214 is fairly high (248 pCi/L).

Hope this helps. Any questions, please let me know. Thanks.

Dawn

Linda Dietz/R3/USEPA/US



Linda Dietz/R3/USEPA/US

04/25/2005 04:02 PM

To Dawn Ioven/R3/USEPA/US@EPA

cc (b) (4) @ttnus.com>

Subject Fw: Thorium-230 results, Safety Light Corporation

Dawn,

Below is a string of e-mails regarding the Thorium-230 results. The question I posed to the lab was that Thorium 230 was detected which is an alpha emitter but the gross alpha calculation was non-detect. Start from the bottom and read up. Andy has been having a problem with the PRG calculator. I need to get this resolved so that I can provide the residential well data to the homeowners. I also need to explain this in English. Thanks !

Linda Dietz
EPA Region III
Remedial Project Manager
215-814-3195

— Forwarded by Linda Dietz/R3/USEPA/US on 04/25/2005 03:59 PM —



(b) (4) @ttnus.com>

04/25/2005 03:51 PM

To Linda Dietz/R3/USEPA/US@EPA

cc

Subject FW: Thorium-230 results, Safety Light Corporation

Linda- See Phil's explanation below (he consulted with a radiochemist in his office as well). The Th-230 is not really in the tap water. Phil



(b) (4)
(b) (4) @ttnus.com>
04/27/2005 11:22 AM

To Dawn Ioven/R3/USEPA/US@EPA, Linda
Dietz/R3/USEPA/US@EPA

cc

bcc

Subject RE: Fw: Thorium-230 results, Safety Light Corporation

Thanks, Dawn- some reading I did on secular equilibrium of radionuclides indicates that equilibrium can occur when the decay products have a much shorter half-life than the parent (in this case Th-230 = 77,000 years vs. Bi-214 = 20 minutes). When equilibrium is reached the activities of all radionuclides in the decay chain are nearly equal. Applying this theory, if the lab reported decay at up to 45 pCi/l, and this is Bi-214 we're seeing, not Th-230, the activity of the Bi-214 should be around 45 pCi/l which is well below the PRG.

Andy

-----Original Message-----

From: Ioven.Dawn@epamail.epa.gov [mailto:Ioven.Dawn@epamail.epa.gov]
Sent: Wednesday, April 27, 2005 9:31 AM
To: Dietz.Linda@epamail.epa.gov
Cc: (b) (4)
Subject: Re: Fw: Thorium-230 results, Safety Light Corporation

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Linda
Dietz/R3/USEPA/U
S

04/25/2005 04:02
PM

Dawn Ioven/R3/USEPA/US@EPA

To

cc

(b) (4)
@ttnus.com>

Subject

Fw: Thorium-230 results, Safety
Light Corporation